

LAYNER, D.I.; KAGAN, N.M.

Phase constitution of catalysts obtained by the leaching of
Al-Ni alloys. Fiz. met. i metalloved 11 no.6:834-842 Je '61.
(MIRA 14:6)

1. Giprotsvetmetobrabotka.
(Aluminum-nickel alloys--Metallography)
(Leaching)

31730

S/081/61/000/021/035/094

B101/B147

18. ~~SECRET~~
AUTHORS: Layner, D. I., Malysheva, L. A.

TITLE: The problem of corrosive destruction of copper - silicon alloys to powder

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 21, 1961, 255, abstract 211118 (Tr. Gos. n.-i. i proyekt. in-ta po obrabotke tsvetn. met., no. 18, 1960, 303 - 312)

TEXT: The corrosive destruction of Cu - Si alloys and the effect of temperature, atmosphere, and of the chemical composition of the alloy, upon its destruction were studied. It has been found that the alloy, if left for a long time in air at room temperature, or if annealed at 150 and 600°C in air or water vapor, crumbles and increases in weight. In some cases, the weight is increased by 40 - 50% as a result of oxidation by atmospheric oxygen. Intercrystalline cracks, which spread over to the grains of the initial Si, are formed on the polished sections by repeated annealing. In the case of long annealing, the crumbling process proceeds

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The problem of corrosive ...

both along the boundaries and in the grains of Si and the intermetallic compound Cu_2Si . Oxidation is the quicker, the higher the annealing temperature, and at 600°C it is more intense in an H_2O vapor atmosphere than in air. Alloys containing 40 - 50% Cu crumble much faster than alloys with lower or higher Cu content. It is believed that the Si contained in the alloy decomposes H_2O , whereby oxygen oxidizes Cu and Si to CuO and SiO_2 , respectively. [Abstracter's note: Complete translation.]

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LAYNER, D.I.; MALYSHEVA, L.A.

Dilatometric investigation of silicon-copper alloys. Trudy
Giprotstvetmetobrabotka no.20:6-13 '61. (MIRA 15:2)
(Silicon-copper alloys) (Dilatometry)

S/680/61/000/020/00/003
D204/D302

AUTHORS: Layner, D. I., Malysheva, L. A. and Sotnikova, L. I.

TITLE: Poisons of the Cu-Si alloy catalysts

SOURCE: Moscow. Gosudarstvennyy nauchno issledovatel'skiy i
proyektnyy institut obrabotki tsvetnykh metallov. Sbornik
nauchnykh trudov. no. 20, 1961, Metallovedeniye i
obrabotka tsvetnykh metallov i splavov, 14-26

TEXT: The authors studied the inhibiting effect of small additions of Pb, Sn and Bi on the catalytic activity of 10% Cu, 90% Si alloys, by measuring the productivity (in g product/kg catalyst/hr) and the percentage yield of Me_2SiCl_2 in the synthesis of methyl chlorosilanes. The alloys were prepared in carbon boats from Kp1 (Kr1) silicon, MO (MO) copper, CB (SV) lead, O1 (O1) tin and 'pure' bismuth (according to TUMKhP 3153-54) (TUMKhP 3153-54), checking the composition by chemical analysis. It was found that Pb, Bi and Sn poisoned the catalyst when in quantities ≥ 0.003 .

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0.005 and $\geq 0.05\%$ respectively. S. A. Golubtsov, I. V. Trofimova
and M. P. Lobusevich aided the authors in the chemical part of
the work. There are 2 tables and 3 Soviet-bloc references.

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S/680/61/000/020/002/015
D204/D302

AUTHORS: Layner, D. I.; Malysheva, L. A. and Sotrikova, L. I.

TITLE:

SOURCE:

Activation of Cu-Si catalysts with antimony
Moscow. Gosudarstvennyy nauchno-issledovatel'skiy i
proyektnyy institut obrabotki tsvetnykh metallov. Sbor.
nik nauchnykh trudov. no. 20, 1961. Metallovenedeniye
i obrabotka tsvetnykh metallov i splavov, 17-19

TEXT: A brief description of catalyst poisons and promoters is
first given, quoting Soviet and Western works. The present in-
vestigation was undertaken to elucidate the action of activators as
there is a lack of information in this field. In preliminary ex-
periments the authors found Cu-Si catalysts could be activated by
not less than 1 - 2% Zn. In further work the effects of small ad-
ditions of Sb were studied, by measuring the influence of the ca-
talyt on the productivity (in g/kg/hr) and percent yields of
 Me_2SiCl_2 in the synthesis of methyl chlorosilanes with and with-
out the Sb promoter. The alloys were prepared from $\text{Kp}^1(\text{Kr})$ sil-
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S/680/61/000/020/003/013
D205/D302

AUTHORS: Layner, D. I. and Krupnikova-Perlina, Ye. I.

TITLE: On the oxidation mechanism of copper at high temperatures

SOURCE: Moscow, Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut obrabotki tsvetnykh metallov. Sbornik nauchnykh trudov, no. 20, 1961. Metallovedeniye i obrabotka tsvetnykh metallov i splavov, 20-27

TEXT: This work was performed to verify the opinions of M. T. Mishchenko and R. R. Gorain of the L'vov Polytechnic Institute. 99.996% pure Cu samples 0.75 x 24 x 100 mm were subjected to oxidation at 1000°C over 5, 10, 15, 20 and 30 hours, by air at atmospheric pressure. Examination of the samples after various times of oxidation leads to the following picture of the mechanism: The oxidation takes place by diffusion of Cu across the product Cu_2O layer. It can be assumed that the formation of elongated Cu_2O

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On the oxidation mechanism ...

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crystals is the outcome of this diffusion. Grain growth, cracks and imperfections develop across the grain boundaries and permit the access of oxygen to the remaining metal. Small polyhedral Cu_2O crystals are formed. At a given moment, this second mechanism may become prevalent. There are 6 figures and 17 references: 13 Soviet-bloc and 4 non-Soviet-bloc. The reference to the English language publication reads as follows: Moore and Selicson, J. of Chem. Phys., v. 19, no. 12 (1951).

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S/680/61/000/020/004/013
D205/D302

18-1285

AUTHORS: Layner, D. I. and Tsypin, M. I.

TITLE: Some structural features of scale formation on titanium

SOURCE: Moscow. Gosudarstvennyy nauchno-issledovatel'skiy i pro-
yektnyy institut obrabotki tsvetnykh metallov. Sbornik
nauchnykh trudov. no. 20, 1961. Metallovedeniye i obra-
botka tsvetnakh metallov i splavov. 28-41

TEXT: The structural characteristics of the scale are the basis
on which one's notions on the diffusion mechanism in the oxidation
process are formed. Parting from this point of view, investigations
were carried out by the same authors on the oxidation of titanium
(Ref. 1: Sb. nauchnykh trudov instituta "Giprotsvetmetobrabotka",
no. 20, Metallurgizdat, 1961, this collection, pp. 42-64). The pre-
sent article is connected with the methods of determining the
scale-formation features. The methods of calculating the interpla-
nar distances of titanium dioxide was based on Ormont's work (Ref.
6: Struktury neorganicheskikh veshchestv (Structures of Inorganic

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D205/D302

Some structural features ...

Substances). Gostekhteorizdat, 1950) and of the intensivities of V. K. Vainshteyn's book (Ref. 7: Strukturnaya elektronografiya (Structural Electronography), AS USSR, 1956). The preferential orientation of the rutile lattice during various regimes of oxidation is discussed in relation to the electronographic images. It is argued that structure of the titanium dioxide scale explains the diffusion mechanism. Some of the conclusions pertaining to this article are given in Ref. 1 (Op. cit.) which is the following paper in this collection. There are 16 figures, 3 tables and 10 references: 7 Soviet-bloc and 3 non-Soviet-bloc.

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S/680/61/000/020/005/013
D205/D302

18.12.85

AUTHORS: Layner, D. I. and Tsypin, M. I.

TITLE: Investigating the structure of titanium scale during its formation

SOURCE: Moscow. Gosudarstvenny nauchno-issledovatel'skiy i proyektnyy institut obrabotki tsvetnykh metallov. Sbornik nauchnykh trudov. no. 20, 1961. Metallovedeniye i obrabotka tsvetnykh metallov i splavov. 42-64

TEXT: The oxidation of titanium is of practical and theoretical interest. On the practical side, it is connected with the problem of corrosion resistance and with some technological properties, for example, antifrictional, of oxide layers. On the theoretical side, many problems still remain unsolved. One of these is the relative roles of the titanium and oxygen ions in the diffusional process, the other is the cubic relationship of the rate of oxidation between 300 and 600°C. The oxidized films were separated from the metal by the use of the etching mixture: 35 ml HCl, 0.1 - 1.0

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Investigating the structure ...

g NaF, 65 ml H_2O . After separation, the floating oxide films were removed with a glass spatula, washed twice in distilled water, dried and placed in the electronograph. Good electronograms were obtained which showed that only one phase, that of TiO_2 , was present. Thickness of the film was determined from the electronograms and plotted vs. time of oxidation for various oxidation temperatures in the 350 - 750°C range. Films obtained at higher temperatures were examined by X-rays and microscopically, owing to their thickness which made them unsuitable for electronographic investigation. In addition, samples of sheet titanium were oxidized in steam at 450, 650 and 850°C. The oxidation of Ti in the 300 - 600°C range followed the cubic relationship and generally confirmed the mechanism proposed by Cofstad et al. (Ref. 1: Acta Chem. Scand. 12, 239, 1958), based on the diffusion of oxygen into the metal from the oxide. Above 600°C a prevailing orientation begins to appear on the external surface of the oxide, pointing to this surface as the locus of the oxide layer formation. Simultaneously the parabolic oxidation becomes prevalent and the diffusion of Ti ions through

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LAYNER, D.I.; TIKHONOV, B.S.; KRUPNIKOVA-PERLINA, Ye.I.; AGAFONOVA, A.V.

Investigations in the field of improving service characteristics
of zinc for printing purposes. Trudy Giprotsvetmetobrabotka
no.20:97-103 '61. (MIRA 15:2)

(Zinc--Metallurgy)

TRANSLATION

S/180/61/000/001/014/015
E073/E535

AUTHORS: Layner, D. I. and Tsypin, M. I. (Moscow)

TITLE: On the Oxidation of Titanium in the Temperature Range
300 to 600°C 19 27

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh
nauk, Metallurgiya i toplivo, 1961, No.1, pp.146-147

TEXT: Usually the "weight increment-time" relations⁶ of
oxidized metallic specimens as a function of temperature are straight
lines, parabolas or logarithmic curves. Existing oxidation theories
by Wagner, Dankov, Mott and others propose oxidation mechanisms that
lead to these relations. However, P. Cofstad, K. Hauffe and
H. Kj8llesdal (Ref.1) have established that in oxidation of titanium
in the temperature range 300 to 600°C the dependence of the weight
increase on time is represented by a cubic parabola, a feature
which has not been observed in the oxidation of other metals. ✓
Titanium can absorb up to 30 at.% of oxygen which dissolves in the
metal and Cofstad et al. proposed a mechanism of oxidation which
explains the experimentally determined time dependence of the
weight increase by diffusion of oxygen in metallic titanium through

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On the Oxidation of Titanium

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an oxide film of constant thickness. Detection of the existence of such films would be a decisive factor in judging whether this mechanism does really take place. For this purpose the authors used a very simple and sufficiently accurate method of determining the thickness of oxide films from their interference colours. Spectrum analysis of arc smelted titanium sheet specimens showed the presence of about 0.04% Si and other metallic admixtures in quantities below 0.01% each (a total of 12 elements were determined). After vacuum annealing (10^{-4} mm Hg) for 30 mins at 800°C the specimens were cleaned with alcohol and oxidized in air. The correspondence of the well known coloration of oxide films on the titanium for the temperature range 350 to 700°C with interference phenomena is confirmed by the table, which indicates the sequence of alternating the colours of the Newton ring and the colours of the wedge-shaped layer of oxides at the surface of the titanium strip, one end of which was in air, whilst the second end was in a furnace at 800°C. The film thickness δ is determined by means of the expression

$$\delta = k \frac{\lambda}{4n}$$

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where $k = 1, 2, 3, \dots$ is the order of reflection, λ is the wavelength of the particular colour which is complementary to the colour of the film, n - refractory index of the film. In this equation the error in the visual determination of λ is about 1.5 to 2% (10 to 15 μ at wavelengths of 400 to 700 μ). The main error is introduced in the averaging of the refraction coefficient for optically uniaxial crystals of TiO_2 -rutile, of which the oxide layers are formed (see earlier work of the authors, Refs.3 and 4), as well as by not taking into consideration dispersion. The average value $n_{av} = 2.8$ if the maximum scatter is 2.6 to 3. Thus, the total random error in the thickness of the film can be evaluated at 10%. Furthermore, a systematic error is introduced due to the absence of accurate data on the conditions of reflections at the boundary oxide-metal; however, this effect is of importance only for the absolute film thicknesses but does not manifest itself on the characteristic form of the curves "film thickness-time". The calculated values of the film thickness were qualitatively confirmed by the change in the character detected in recent electron diffraction investigations of the authors (Ref.4).

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The obtained film thickness values given in the graphs (top graph
a - for the temperature range 350 to 600°C; bottom graph
b - for the range 550 to 700°C; δ , Å vs. τ , min) show clearly that
if titanium is oxidized in the temperature range 350 to 550°C the
forming oxide films will reach a practically constant thickness and,
consequently, the results confirm the correctness of the mechanism
for oxidation of titanium in the intermediate temperature range
(about 300 to 600°C) proposed by Cofstad et al. There are
1 figure, 1 table and 4 references: 3 Soviet (1 a translation from
English) and 1 non-Soviet.

(Note: this is a complete translation)

SUBMITTED: January 28, 1960

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On the Oxidation of Titanium

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Sequence of Basic Colours of the Wedge-shaped
Oxide Layer on Titanium

Order of reflection	Colour of the wedge- shaped air gap (Newton ring) in transmitted light	Colour of oxides on titanium in reflected light
I	Yellow	Yellow
	Red to	Brown
	Violet	
	Dark Blue	Violet
II		Dark Blue
	Green	Pale Blue
	Yellow	Greenish
	Red *	Yellow
		Purple
	Dark Blue	Violet
	Green	Dark Blue
		Green

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On the Oxidation of Titanium.....

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✓

III

Yellow
Red
Greyish Blue
Green

Yellow
Purple
Dark Blue
Green

IV

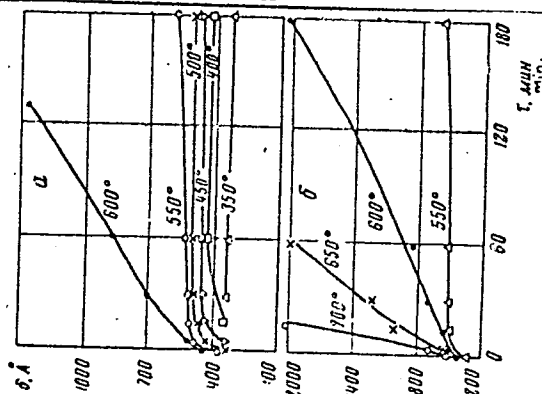
Dull-yellow
Red
Green

Greyish-yellow

Dull-violet

Fig.

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Толщина окисной пленки на титане, образуемая в интервалах температур 350-600° C (a) и 550-700° C (б)

89422

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S/136/61/000/002/003/006
E073/E335

AUTHORS: Layner, D.I. and Golubtsova, L.M.

TITLE: Means of Improving the Thermo-electric Properties
of the Semiconductor Alloy Zinc-antimony

PERIODICAL: Tsvetnyye metally, 1961, No. 2, pp. 69 - 74

TEXT: In the first approximation the efficiency of a material for producing thermo-electricity can be estimated on the basis of the product $\alpha^2 \sigma$ where α is the thermo-electric coefficient, $\mu\text{V}/^\circ\text{C}$; σ is the specific electrical conductivity $\text{ohm}^{-1}\text{cm}^{-1}$. Classical materials for producing thermo-electricity are; intermetallic ZnSb compounds and electron lead sulphide. ZnSb compounds form by a peritectic reaction at 545°C ; thereby the concentration of the components is 35 wt.% Zn and 65 wt.% Sb. Microscopic analysis indicates that for a Zn content below 35 wt.% the alloy contains Sb and SbZn which may be present as a eutectic and as larger crystals. Alloys containing Zn in quantities of 35-45 wt.% always contain a mixture of crystals of the two intermetallic

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Means of Improving

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compounds $\text{SbZn}(\alpha)$ and $\text{Sb}_3\text{Zn}_4(\beta)$. The compound SbZn is a hole-type semiconductor (this compound was investigated by Ye.D. Devyatkova, Yu.I. Maslakovets and I.V. Mochan of the AS USSR). In determining the electrical conductivity various investigators used specimens of different sizes. On small specimens I.V. Mochan (Ref. 1) determined the values $\sigma = 4 \times 10^{-3}$ and on larger specimens Ye.D. Devyatkova and Yu.I. Maslakovets (Ref. 2) obtained the value equalling $80 \text{ ohm}^{-1} \text{ cm}^{-1}$. The width of the barrier zone equals 0.7 - 0.8 eV (Ref. 1); the thermo-e.m.f. of the compound equals 180 - 220 $\mu\text{V/deg}$ and even the smallest shift in the ratio of the components reduces it considerably. The authors carried out experiments with a view to improving the thermo-electric properties of ZnSb compounds by introducing admixtures of various elements. A total of 150 ZnSb compounds were tested which contained admixtures of various elements, both separate and combined: Cu; Ag; Bi; Si; Ge; Sn; Pb; In; Te; Al; Cd and Fe. The melting was in a high-frequency

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Means of Improving

induction furnace inside graphite crucibles. The basic components were introduced into the charge designed to produce 500 g of the alloy with an excess of zinc of 0.4% compared with the stoichiometric composition. Melting was carried out at 750-800 °C with careful mixing during the process. Teeming was into metallic moulds at a temperature of the order of 700 °C. The sequence of feeding the charge was as follows:

a) Zn, admixtures, Sb for alloys with additions of low-melting point metals; b) charging Zn and Sb simultaneously and introducing the admixtures into the molten metal; this was done in the case of high melting-point admixtures. From the alloy, 8 x 10 x 15 mm specimens were pressed (4 tons/cm²) at 400 °C. The electric conductivity σ was measured by a compensation method, using probes for tapping-off the voltage. The thermo-e.m.f. α was also measured by a compensation method relative to lead with a temperature difference of 18-20 °C. It was found that a great increase in the electric conductivity can be achieved by using additions of Cu, Ag and Ge. The obtained results for Cu are graphed in Fig. 1

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(α , $\mu\text{V}/\text{deg}$ and σ , $\text{ohm}^{-1}\text{cm}^{-1}$ as functions of the Cu content, %) for additions of Cu; in Fig. 2 - for additions of Ge (same notation); in Fig. 3 - for additions of Sn; in Fig. 4 - for additions of Bi and in Fig. 5 - for additions of In. In contrast to results of Devyatkova and Maslakovets (Ref. 2), according to which the "hole" concentration reaches a maximum, for a content of 0.5% Sn the authors of this paper found a continuous increase in the electric conductivity with increasing Bi and Sn contents up to concentrations of 2%. Microstructural and X-ray-structural analyses did not reveal the presence of any new phase differing from SbZn and Sb_3Zn_4 . All the investigated alloys showed a qualitatively similar picture in the angular range $10-40^\circ$. However, certain changes in the intensity of the lines corresponding to SbZn were observed. Obviously, the change in properties is due to complicated structural processes in the crystal lattice, which require application of finer methods of analysis. Nomograms of the change in the properties of materials alloyed with elements of various groups of the periodic system indicate that the best results

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Means of Improving

can be achieved if Ag, Cu or Ge are used. A considerable increase in the thermo-e.m.f. is achieved by additions of Sn and Si and a less intensive increase is achieved by the addition of Pb and Bi. An increase in the thermo-e.m.f. in the case of an alloy with Cd only or with Si only is accompanied by a sharp drop in the electric conductivity and is not of practical interest. For practical purposes, the best properties are achieved with additions of Sn, Pb, Bi in which the high thermo-e.m.f. are combined with a sufficiently high electric conductivity. Still better results can be obtained by alloying with several elements since, separately, none of these is able to ensure satisfactory properties. Good results were achieved with an alloy containing (% of the weight of the SbZn compound) 35 Zn, 65 Sb, 2 Bi and 1.5 Sn. By means of this alloy the following results were achieved: $\alpha = 280-300 \mu\text{V/deg}$ for σ not less than $200 \text{ ohm}^{-1} \text{ cm}^{-1}$ and $\alpha^2 \sigma = 18-20$. This alloy can be used successfully in the anode blocks of thermal batteries; 0.5% Ag is introduced into the heating blocks for

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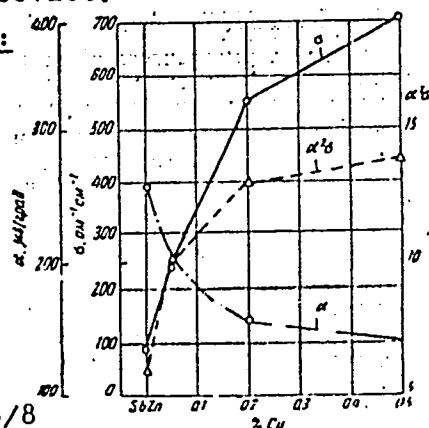
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Means of Improving

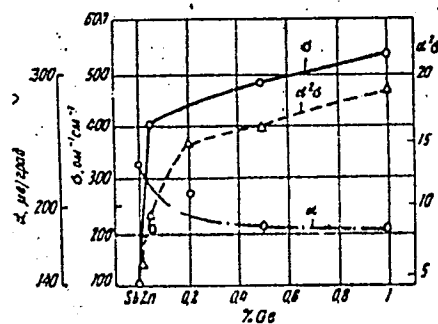
increasing the electric conductivity and in this case $\alpha = 200 \mu\text{V/deg}$, $\sigma = 700 \text{ ohm}^{-1} \text{ cm}^{-1}$ and $\alpha\sigma = 30$. There are 8 figures and 7 references: 5 Soviet and 2 non-Soviet.

Fig. 1:



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Fig. 2:



Means of Improving

Fig. 3:

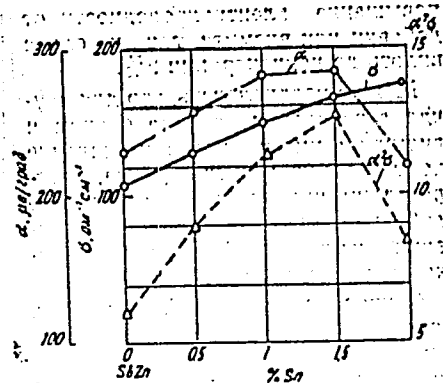


Рис. 3. Зависимость электрических свойств сплава от содержания олова

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Fig. 4:

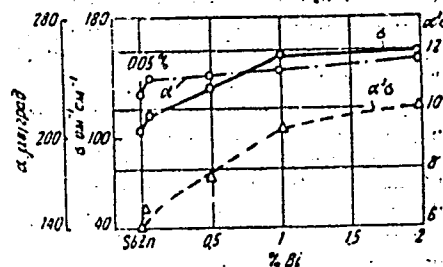


Рис. 4. Зависимость свойств сплава от содержания висмута

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Means of Improving

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Fig. 5:

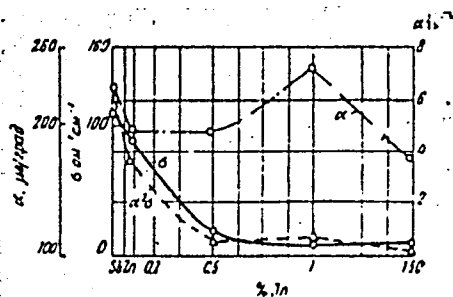


Рис. 5. Зависимость электрических свойств от содержания индия

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LAYNER, D.I.; BAZHENOVA, L.A.; AGAFONOVA, A.V., Prinimali uchastiye:
PAKHOMOVA, Ye.F., inzh.; KORSUNSKAYA, K.N., inzh.

Effect of various additions on the modification and recrystallization
temperature of zinc. Trudy Giprotsetmetobrabotka no.20:81-96
'61. (MIRA 15:2)

(Zinc—Metallurgy) (Crystallization)

LAYNER, D.I.; KAGAN, N.M.

Phase composition of skeleton nickel catalysts. Trudy
Giprotsvetmetobrabotka no.20:104-116 '61. (MIKA 15:2)
(Catalysts, Nickel--Testing) (Nickel--Metallography)

LAYNER, D.I.; DRUPNIKOVA-PERLINA, Ye.I.; BAY, A.S.

Electron microscopy for the determination of metal texture. Trudy
Giprotsvetmetobrabotka no.20:142-147 '61. (MIRA 15:2)
(Metallography) (Electron microscopy)

S/680/61/000/020/009/013
D205/D302

AUTHORS: Layner, D. I. and Nikol'skaya, I. M.
TITLE: Modification of bronzes, resistant to pressure working
Ep047-0.2 (BrOF7-0.2) and Ep047-3 (BrOTs4-3) by addi-
tions of zirconium, titanium and boron
SOURCE: Moscow, Gosudarstvennyy nauchno-issledovatel'skiy i pro-
yektnyy institut obrabotki tsvetnykh metallov. Sbornik
nauchnykh trudov, no. 20, 1961. Metallovedeniye i obra-
botka tsvetnykh metallov i splavov, 148-158

TEXT: The aim of the present investigation was to improve the
pressure-working characteristics of the above bronzes by modifying
their cast structures by various small additions. A detailed sum-
mary of the published work on related subjects is first given. The
influence of 0.01 - 0.5% w/w of Zr, Ti and B, introduced together
with the Cu in the form of an alloy, on the structure, mechanical
properties and workability of the bronzes was investigated. 500 g
samples of alloys were smelted in a low-ash graphite crucible and

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S/680/61/000/020/009/013

S/680/61/000/020/002/000
D204/D302

AUTHORS: Layner, D. I., Malysheva, L. A. and Sotrikova, L. I.
TITLE: Activation of Cu-Si catalysts with antimony
SOURCE: Moscow, Gosudarstvennyy nauchno-issledovatel'skiy i
proyektnyy institut obrabotki tsvetnykh metallov. Sbornik
nauchnykh trudov. no. 20, 1961. Metallovedeniye i
obrabotka tsvetnykh metallov i splavov, 17-19

TEXT: A brief description of catalyst poisons and promoters is first given, quoting Soviet and Western works. The present investigation was undertaken to elucidate the action of activators as there is a lack of information in this field. In preliminary experiments the authors found Cu-Si catalysts could be activated by not less than 1 - 2% Zn. In further work the effects of small additions of Sb were studied, by measuring the influence of the catalyst on the productivity (in g/kg/hr) and percent yields of Me_2SiCl_2 in the synthesis of methyl chlorosilanes with and without the Sb promoter. The alloys were prepared from Kp1 (Kr) silane.

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Activation of Cu-Si ...

S/680/61/000/020/002/C13
D204/D302

con, electrolytic MO (MO) copper and Cu (Cu) antimony, by fusion in graphite boats at 1550-1600°C, without fluxes, and contained 3.10 or 20% Cu and 0.005, 0.01, 0.02 or 0.05% Sb. Antimony was found to act as an activator when present in quantities $\leq 0.005\%$, increasing the yield ~ 1.5 times, and as a catalyst poison in the range 0.01 - 0.05%. These results were confirmed by work with Cu-Si ingots produced by (1) the experimental 'Giprotsvetmetobrabotka' works and (2) an industrial non-ferrous metals plant. S. A. Golubtsov, I. V. Trofimova and N. P. Lobusevich aided the authors in the chemical part of the work. There are 1 figure, 1 table and 4 references: 2 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: T. Griffiths, The Mechanism of Contact Catalysis, p.p. 74-76, 1936; C. Audibert and A. Reinan, Ind. Eng. Chem., 20, 1105, 1928.

Card 2/2

LAYNER, D.I.; KRUPNIKOVA-PERLINA, Ye.I.

Copper deformation texture produced by rolling. Trudy
Giprotsvetmetobrabotka no.20:159-166 '61. (MIRA 15:2)
(Copper—Metallography)

S/126/61/012/003/010/021
E193/E135

AUTHORS: Layner, D.I., and Slesareva, Ye.N.

TITLE: The effect of tin on oxydation of titanium

PERIODICAL: Fizika metallov i metallovedeniye, vol.12, no.3, 1961,
395-402

TEXT: Although tin is added to titanium-base alloys to stabilise the α -phase, to ensure good weldability, and to improve the workability of titanium-base alloys with a high aluminium content, little is known about the effect of this element on oxydation of titanium. A.E. Jenkins (Ref.1: J. Inst. Metals, 1955, Vol.84, No.1, 1) who had studied the 11.4% Sn-Ti alloy, found that in the presence of Sn the rate of oxydation of titanium at high temperatures (starting from 850 °C) rapidly increased. He postulated that the ability of oxygen to diffuse through the scale and through the metal under the scale is the governing factor in the process studied. On the other hand, the results obtained by some Soviet workers indicated that diffusion of titanium plays a predominant part in the formation of titanium scale. The object of the present investigation was to check the Card 1/5

The effect of tin on oxydation of ... S/126/61/012/003/010/021
E193/E135

results obtained by Jenkins. The experimental work was carried out on binary alloys containing 0.02, 1.65 or 9.0 wt.% Sn, melted in a vacuum-arc furnace, forged, rolled, and annealed in air. The oxydation tests were conducted on polished specimens 10 x 10 x 15 mm, the increase in weight being used as the measure of the degree of oxydation. The results are reproduced in Fig.1, where the increase in weight (mg/cm²) is plotted against time (τ , hours) at temperatures indicated by each curve. The experimental points denoted by circles, dots, crosses and triangles relate, respectively, to pure titanium and to titanium alloys containing 0.02, 1.65 and 9.0% Sn. It will be seen that the rate of oxydation of titanium, practically unaffected by 0.02 and 1.65% Sn additions, increased more than fivefold (at 1000 °C) in the presence of 9% Sn. This difference was also reflected in the results of X-ray diffraction analysis of the scale. Scale formed on the former two alloys consisted almost exclusively of TiO₂, whereas that formed at 1000 °C on the 9% Sn alloy consisted of the following four layers: textured TiO₂; TiO₂ with no texture; TiO; Sn at the TiO/alloy interface. Another effect of the

Card 2/85

The effect of tin on oxydation of.. S/126/61/012/003/010/021
E193/E135

presence of a large proportion of tin in the alloy was revealed by microhardness measurements. It was found that microhardness of the alloy layer saturated with oxygen (that is the layer adjacent to the scale) varied depending on the Sn content, being 945, 675, and 300 kg/mm² in the 0.02, 1.65 and 9% Sn-Ti alloys, respectively. The conclusions reached by the present authors can be summarised as follows. In the presence of small quantites of tin the mechanism of oxydation of the Ti-Sn alloys is the same as that for pure titanium: when the tin content is high the process of oxydation also begins by the formation of TiO₂, but at the same time tin which is surface-active in respect to titanium diffuses towards the surface metal layers. As a result, the concentration of Sn in the surface layer may increase to such an extent that localised melting of the alloy takes place. Since diffusion through a liquid face proceeds at a rate considerably faster than through the solid metal, this effect would explain the rapid increase of the oxydation rate in the Sn-rich titanium alloys. It is also possible that the outward diffusion of titanium causes the formation of vacancies in the interior of the specimen, whereby

Card 3 *LS*

The effect of tin on oxydation of ...

S/126/61/012/003/010/021
E193/E135

diffusion of titanium is facilitated. This, combined with the increase in the rate of diffusion due to the presence of a liquid phase, leads to the formation of an internal TiO layer at the Sn/TiO₂ interface, which means that, contrary to the conclusions of Jenkins, counter-current diffusion is taking place. This is indicated not only by the presence of an Sn layer at the metal/scale interface, but also by the absence of oxygen-saturated metal layer under the scale, formed on the Sn-rich alloys. The latter effect indicates that, in the presence of a liquid, Sn-rich phase, diffusion of titanium increases to such an extent that practically all oxygen diffusing through the scale is taken up by titanium diffusing outward from the alloy. Thus, the catastrophic rate of oxydation of the 9% Sn-Ti alloy at high (> 700 °C) temperatures must be attributed to the outward diffusion of titanium which can take place owing to the formation of a layer of a liquid, Sn-rich phase. There are 4 figures, 2 tables and 7 references: 3 Soviet-bloc and 4 non-Soviet-bloc. The English language references read: Ref.1: as quoted in the text above.

Ref.6: M. Hansen. Constitution of Binary Alloys. 1958, p. 1212.

Card 4, 1/5-

The effect of tin on oxydation of ...

S/126/61/012/003/010/021
E193/E135

ASSOCIATION: Giprotsvetmetobrabotka pri VSNKh
(Giprotsvetmetobrabotka at VSNKh)

SUBMITTED: January 27, 1961

Card 5/6₅-

L 13063-63

BDS/EWP(q)/EWT(m) AFFTC/ASD JD

ACCESSION NR: AT3003009

S/2927/62/000/000/0223/0235 58
57

AUTHOR: Meskin, S. S.; Layner, D. I.; Kogan, L. M.; Trushina, V. Ye.; Libov, L. D.

TITLE: Titanium rectifiers [Report of the All-Union Conference on Semiconductor Devices held in Tashkent from 2 to 7 October 1961]

SOURCE: Elektronno-dy^{IV}rochny^{IV}ye perekhody* v poluprovodnikakh. Tashkent, Izd-v. AN UzSSR, 1962, 228-235

TOPIC TAGS: titanium rectifier

ABSTRACT: Construction, physical phenomena, and results of testing of titanium rectifiers (manufactured in USSR since 1959) are reported. Electrophysical data of the source material, rutile, is given. Current-voltage characteristics (for 20, 150, and 250C), reverse-current-density, forward-voltage drop, cutoff voltage, differential resistance, capacitance, and barrier-layer width as functions of temperature (20-250C) are presented. Also resistance-voltage curves are given for the above 3 temperatures and within -5 +2 v. The following data that can be considered as ratings are supplied: operating temperature range -60 +250C; working voltage per element 11-25 v amplitude; reverse-current density 4, 6, and 8 ma per sq cm at -60, +20C, 150C, and 200-250C respectively; forward-current density

Card 1/2

L 13063-63

ACCESSION NR: AT3003009

100-200 ma per sq cm; life 5,000 hrs or more at 20C. Orig. art. has: 9 figures,
4 formulas, and 2 tables.

ASSOCIATION: Akademiya nauk SSSR (Academy of Sciences SSSR); Akademiya nauk
Uzbekskoy SSR (Academy of Sciences UzSSR); Tashkentskiy gosudarstvennyy
universitet (Tashkent State University)

SUBMITTED: 00

DATE ACQ: 15May63

ENCL: 00

SUB CODE: 00

NO REF SOV: 001

OTHER: 007

Card 2/2

33166

18.8300

S/136/62/000/002/003/004
E021/E135

AUTHORS: Layner, D.I., and Slesareva. Ye.N.

TITLE: The influence of some alloying additions on the oxidation of titanium

PERIODICAL: Tsvetnyye metally, no.2, 1962, 70-76

TEXT: The influence of 0-15% Al, 0-9% Zr, 0-17.7% W, 0-8.7% Nb, 0-17.7% Ta, 0-3.2% Si, 0-8% Mo, 0-6% V, 0-6% Mn and 0-9% Sn was investigated. The change in weight during oxidation was determined and phase analysis of the scale and metallic layer under the scale was carried out. Microhardness determinations to find the depth of penetration of oxygen were also made. Results showed that W, Ta, Nb, Si and Mo lower the rate of increase in weight; Zr, Mn and Al have little effect on the weight increase; and V and Sn increase the rate of change in weight. Fig.1 shows the increase in weight ($\text{mg/cm}^2 \cdot 10^{-4}$) of alloys containing W, Ta, Nb, Si and Mo during oxidation against time (hours). After 7 hours at 900 °C alloys containing Si and W form a thicker scale (0.035-0.040 mm) than alloys containing Ta or Nb (0.01-0.15 mm). Unalloyed Ti has a scale 0.1 mm thick.

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33166

The influence of some alloying ...

S/136/62/000/002/003/004
E021/E135

Oxygen penetrated the alloy containing Si to a depth of 0.08 mm, the alloy containing Ta to 0.15 mm, and the alloy containing Nb to a depth of 0.30 mm. The alloy containing W had oxygen penetration to a depth of 0.65 mm. There is a layer of fine grained WO_3 underneath the layer of coarse grained rutile. Fig.5 shows the increase in weight during oxidation against time for alloys containing Al and Zr. The scale on the alloy containing Al consists only of rutile. There are additional lines on the X-ray photographs which do not correspond to either Al or Al_2O_3 . Fig.7 shows the increase in weight of alloys containing V, Sn and Mn against time. Phase analysis of the scale on the alloy containing tin consisted of TiO_2 on the surface, TiO under the rutile and metallic tin at the metal-scale interface. The phase analysis of the alloy containing V showed only rutile. There are 8 figures, 1 table and 12 references: 4 Soviet-bloc and 8 non-Soviet-bloc. The four most recent English language references read as follows:
Ref.1: Steel, v.143, no.17, 1958, 46.

Card 2/ 3

33166

The influence of some alloying ...

S/136/62/000/002/003/004
E021/E135

Ref.3: H.W. Maynor, R.E. Swift, Corrosion, no.6, 1956, 49.

Ref.6: H. Margolin, Metal Progress, v.71, no.2, 1957, 86.

Ref.9: F.W. Fink, R.S. Peoples. Titanium Metallurgical
Laboratory, Battelle Memorial Institute TML, 1956, I, 29,
pp.60, 30, ICI, v.2, no.3, 1956, 95.

Card 3/6 3

45226

S/806/62/000/003/010/018

18 8300

AUTHORS: Layner, D.I., Tsypin, M.I.

TITLE: On the first stages of the oxidation of titanium.

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniye splavov tsvetnykh metallov. no.3. 1962, 116-125.

TEXT: The paper describes an investigation concerned with the initial stages of the oxidation of Ti in air and in water vapor and demonstrates that the oxidizing medium determines not only the kinetics of the oxidation but also characteristics of the scale formed, such as the type of the growth texture. Electron-microscopy was employed largely. A Ti-O phase diagram is plotted from all available literature data, including the boundary of the ordering of the α solid solution, more accurate information on the composition and boundary of the ω phase; the region of existence of α and β TiO, the magnetic transformation in Ti_2O_3 at $160^\circ C$, and a presentation of the homologous series of $Ti_nO_{2(n-1)}$ oxides. The tests for thin oxide films consisting of rutile showed that the rutile film is practically one single crystal thick ($450-550 \text{ \AA}$ upon oxidation in air at $550^\circ C$) and that it is formed predominantly by outward diffusion of Ti ions. This is in agreement with the conclusions of P. Kofstad et al. (Acta Chem.Scand., no.12, 1958, 239-280) relative to the kinetics of scale

Card 1/4

On the first stages of the oxidation of titanium.

S/806/62/000/003/010/018

formation at 300-600°. The Kofstad mechanism is briefly summarized and present electron-microscope evidence is adduced to confirm it. With increasing T and oxidation time the formation of more and more sharply bounded rutile crystals was observed, the exterior shape of which is consistent with textbook examples of the habitus of rutile crystals and twins. Disagreement with Kofstad's interpretation of the experimental facts is based on the following reasonings: Kofstad assumed that the determining element in the scale formation is the diffusion of O ions toward the scale-metal discontinuity surface. He oxidized the Ti after rolling, under the assumption that the rolling texture of the Ti would be reflected in the texture of the scale. The appearance of a texture in the scale was then taken to represent a confirmation of the assumption. If that were so, then the oriented texture would follow the texture of the metal best where the scale layer is extremely thin and - in thick scale - where the scale layer adhered most completely to the metal. Neither of these phenomena was observed by Kofstad; the exact opposite was observed in the present investigation (photographs). That rolling texture cannot have much influence on the texture of the scale is also reasonably concluded from the fact that the oxidation occurs in conditions (850°C) in which the Ti specimen is annealed. It is shown that the scale texture cannot be due to recrystallization of the TiO_2 and that the only admissible mechanism for scale formation is its formation on its exterior surface and consists of a reaction between the Ti ions diffusing outwardly from the interior

Card 2/4

S/806/62/000/003/010/018

On the first stages of the oxidation of titanium.

and the ambient C. Other investigations have not been able to identify any orientation of the scale texture at all, and this is attributed to the preliminary grinding and etching of the Ti-specimen surface which resulted in a disordered microrelief comparable in height with that of the rutile crystals (1μ). The rolling-and-annealing method used to prepare the specimens in the present investigation yielded a microrelief a full order of magnitude lower and two orders of magnitude less dense (in humps per running mm) than the grind-and-etch method and, hence, interfered less with any textural tendency of the scale growth. The second set of experiments, with oxidation accomplished in water vapor, showed not only much greater intensity of oxidation but also a fundamentally different type of oxidation process than in air: With increasing T and time the outer scale surface becomes increasingly smooth, because the crystals formed in steam oxidation grow so large that their flat surface becomes relatively large with respect to their inter-crystal boundaries. Then, once the rutile crystals grow beyond 5μ , a fundamentally novel stage occurs, with the rapid growth of thin acicular crystals at separate points of the surface (photograph). These needles were found to be near-perfect rutile single-crystals as demonstrated by the existence of Kikuchi lines in the microdiffractional pictures. With increasing T and time the needles grow in length and thickness and occupy an increasing portion of the visual field of the electron microscope. They become firmly attached to the underlying rutile layers, until the replicas show no

ASSOCIA:

Card 3/4

Card 4/4

which are 7
- English-language).

LAYNER, D.I.; SLESAREVA, Ye.N.

Effect of tungsten on the oxidation of titanium. Fiz. met. i
metalloved. 14 no.3:400-405 S '62. (MIRA 15:9)

1. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy
institut obrabotki tsvetnykh metallov pri Vysshem sovete
narodnogo khozyaystva.
(Titanium--Corrosion) (Tungsten)

11169

S/136/62/000/011/001/002
E021/E435

18.5100
18.12-00

AUTHORS: Layner, D.I., Solov'yev, V.Ya.,
Krupnikova-Perlina, Ye.I., Kachur, Ye.V.

TITLE: Study of the deformation texture of rolled niobium

PERIODICAL: Tsvetnyye metally, no.11, 1962, 80-85

TEXT: The main orientations in rolled niobium and the influence of the degree of deformation and the effect of some impurities on the texture of the deformation were studied. Niobium prepared by both the carbon-thermal and the sodium-thermal methods was used. Some of the niobium was vacuum-sintered at 2300°C in the form of bars 20 x 20 x 600 mm, some was remelted in a vacuum-arc furnace to 70 mm diameter bars and some was remelted in an electron-beam furnace to 80 mm diameter bars. Some of the bars were forged and then cold rolled with intermediate annealing; the total deformation was 83%. The deformation texture was then compared for the different starting materials which contained different amounts of impurities (O₂ - 0.152 and 0.083, N₂ - 0.04 and 0.1, C - 0.04 and 0.07, Si - 0.012 and 0.005 for sodium-and carbon-thermal methods respectively). The influence of the melting
Card 1/2

S/126/62/013/004/010/022
E111/E435

AUTHORS: Layner, D.I., Tsypin, M.I.

TITLE: Some problems of the formation of scale on metals

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.4, 1962,
561-566

TEXT: On the example of titanium the optimum conditions for revealing texture in oxide layers are determined. Electron-diffraction patterns indicated texture in the surface layers, probably associated with the surface geometry of their initial titanium. The best starting material from surface-preparation aspects for studying scale on sheets is one annealed after cold-rolling in a vacuum. In studying texture in scale, identification of orientation with growth or orientation compatibility texture is important. From the observations made it is evident that the surface of the scale is where the main scale component (rutile) is formed, but the interpretation of similar results by P.Kofstad, K.Hauffe and H.Kjöllesdal was incorrect. Another possible cause of scale texture is recrystallization of titanium dioxide on heating at up to 850°C for three hours, thus leaving

Card 1/3

S/126/62/013/004/010/022
E111/E435

Some problems of the formation ...

growth texture as the cause (for oxidation in air, steam and oxygen); this has not been confirmed by the present authors. Examination of scale obtained under various conditions suggests that the formation of a new layer of scale depends essentially on surface and not volume diffusion. Published views on these questions are contradictory. The above results relate to relatively thick scale layers. Next, oxide layers, only some hundreds of angstroms thick, are considered. Microdiffraction investigation (with an electron microscope) has shown that within the boundaries of a grain of the original metal the oxide is precisely orientated, but as this orientation varies from grain to grain the macroscopic orientation of the oxide crystals is random: thus, failure to detect texture by ordinary X-ray and electron diffraction studies of thin films does not indicate absence of connection between oxide orientation and base structure. As scale thickens, orientation differences between adjacent colonies of crystals rather than between oxide crystals affect the orientation within the boundaries of a micro-grain of the original metal. In the case of growth of needle-like rutile crystals,

Card 2/3

LAYNER, D.I.; BAY, A.S.

Mechanism of titanium oxidation. Fiz. met. i metalloved. 14 no.2:283-286
Ag '62. (MIRA 15:12)

1. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut
obrabotki tsvetnykh metallov.
(Titanium--Metallography) (Oxidation)

S/032/62/028/006/015/025
B101/B138

AUTHORS: Layner, D. I., Krupnikova, Ye. I., and Bay, A. S.
TITLE: Electron microscopic determination of the preponderant
orientation of polycrystalline materials
PERIODICAL: Zavodskaya laboratoriya, v. 28, no. 6, 1962, 703 - 705

TEXT: A report is given on the determination of the texture of polycrystalline materials by electron microscopic recording of etching figures. Coppernickel 80/20, annealed copper and Cu_2O , obtained by oxidation of Cu at 1020°C and quenching in water, were investigated. Etching of copper-nickel was carried out in a mixture of 50% acetic acid and 50% nitric acid, etching of Cu in 50% HNO_3 , and of Cu_2O in 10 - 15% HNO_3 . The etching figures were investigated with an EM-3 (EM-3) electron microscope using carbon replicas. The results agreed well with the data obtained from X-ray recordings of the pole figures. Results: (1) Annealed coppernickel deformed by 96% showed two types of etching figures, narrow grooves corresponding to the orientation (110), and lamellas with jagged edges,

Card 1/2

LAYNER, D.I.; SLESAREVA, Ye.N.

Effect of certain addition elements of titanium oxidation. TSvet.
met. 35 no.2:70-76 F '62. (MIRA 15:2)
(Titanium--Metallurgy) (Oxidation)

LAYNER, D.I.; SOLOV'YEV, V.Ya.; KRUPNIKOVA-PERLINA, Ye.I.; KACHUR, Ye.V.

Investigating deformation textures of rolled niobium. TSvet. met.
35 no.11:80-85 N '62. (MIRA 15:11)

(Niobium--Metallography)
(Deformations (Mechanics))

TURETSKAYA, R.A.; GOLUBTSOV, S.A.; TROFIKOVA, I.V.; ANDRIANOV, K.A.;
Prinimali uchastiye: LAYNER, D.I.; SOTNIKOVA, L.I.;
MALYSHEVA, L.A.

Effect of the admixture of some metals on the activity of
silicon-copper alloys in the reaction with theyl chloride.
Zhur.prikl.khim. 35 no.7:1496-1502 J1 '62. (MIRA 15:8)

1. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy
institut obrabotki tsvetnykh metallov (for Layner, Sotnikova,
Malysheva).

(Silicon-copper alloys) (Ethane) (Metals)

LAYNER, D.I.; NIKOL'SKAYA, I.M.

Effect of certain small additions on the structure and properties
of tin bronze. Issl. splav. tsvet. met. no.4:245-248 '63.
(Bronze--Metallurgy) (MIRA 16:8)

LAYNER, D.I. (Moskva); BAY, A.S. (Moskva)

Mechanism of titanium oxidation in the 800 - 1000° temperature.
range. Izv. AN SSSR. Met. i gor. delo no.5:145-151 S-O '63.
(MIRA 16:11)

LOBUSEVICH, N.P.; LAYNER, D.I.; TROFIKOVA, I.V.; MALYSHEVA, L.A.;
ANDRIANOV, K.A.; GOLUBTSOV, S.A.

Reactions of alkyl (aryl) chlorosilane formation by the direct
interaction between alkyl (aryl) chlorides and silicon. Report No.5:
Phase composition of silicon-copper contact masses in reactions with
methyl chloride. Izv. AN SSSR Ser.khim. no.10:1757-1766 O '63.
(MIRA 17:3)

1. Nauchno-issledovatel'skiy i proyektnyy institut splavov i
obrabotki tsvetnykh metallov.

ACCESSION NR: AR4027674

S/0276/64/000/001/BC78/BC78

SOURCE: RZh. Tekhnologiya mashinostroyeniya, Abs. 1B435

AUTHOR: Layner, D. I.; Bay, A. S.; Tsy*pin, M. I.

TITLE: Some peculiarities of titanium oxidation in various media

CITED SOURCE: Tr. Gos. n.-i. i proyekt. in-ta splavov i obrabotki tsvetn. met.,
vy*p. 21, 1963, 62-68 "

TOPIC TAGS: titanium, titanium oxidation

TRANSLATION: The authors present the results of studies on the peculiarities of titanium oxidation in air and water vapor media. It is shown that rutile formed during titanium oxidation in air has a composition which is more closely stoichiometric than that formed in the presence of water vapor or carbon oxides, which in all probability tends to increase the rate of titanium and oxygen ion diffusion. It can be supposed that the acceleration of the oxidation process under these conditions leads to the simultaneous alteration of the composition of scale on the titanium (a deviation from the stoichiometric relationship for

Card 1/2

ACCESSION NR: AR4027674

TiO₂) and the morphological characteristics of scale with a constant phase composition. Bibliography with 10 titles.

DATE ACQ: 03Mar64

SUB CODE: ML:nd

ENCL: 00

Card 2/2

ACCESSION NR: AR4018340

8/0137/64/000/001/1099/1099

SOURCE: RZh. Metallurgiya, Abs. 11645

AUTHOR: Layner, D. I.; Tsy*pin, M. I.; Bay, A. S.

TITLE: Electron microscopic study of the scale structure on titanium

CITED SOURCE: Tr. Gos. n.-i. i proyekt. in-ta splavov i obrabotki tsvetn. met.,
vy*p. 21, 1963, 69-78

TOPIC TAGS: titanium scale, titanium oxidation

TRANSLATION: Cr-shadowed replicas of Ti scale were studied with an EM-3 electron microscope having a resolving power of ~ 100 Å. When Ti is oxidized in air, the coarse outer crystalline layer does not penetrate into the interior of the scale even under drastic oxidation conditions (900 C, 5 hr). When Ti is oxidized in steam, the columnar layer of scale on Ti, formed by large fused acicular crystals, makes up the bulk of the scale. L. Petrova

SUB CODE: MM

ENCL: 00

Card 1/1

USOVA, V.V.; LAYNER, V.I.

Copper plating of titanium and its alloys. Izv. vys. ucheb.
zav.; tsvet. met. 6 no.4:132-137 '63. (MIRA 16:8)

1. Moskovskiy institut stali i splavov, kafedra korrozii i
zashchity metallov.

(Titanium--Electric properties)
(Copper plating)

L 12788-63

ACCESSION NR: AP3000790

EMP(q)/EWT(m)/BDS

AFTTC/ASD JD

AUTHOR: Layner, D. I.; Tsy*pin, M. I.; Bay, A. S.

S/0070/63/008/003/0477/0478

TITLE: Structural relation between metal and oxide during oxidation of titanium

SOURCE: Kristallografiya, v. 8, no. 3, 1963, 477-478

TOPIC TAGS: martensite transformation, reciprocal lattice, electron microscope, Ti, rutile, microdiffraction

ABSTRACT: This study was undertaken because of disagreement relative to the existence and nature of interconnection between structures in metals and the coating of secondary products formed by chemical reaction. Previous work by two of the authors (Layner, D. I.; Tsy*pin, M. I. Izv. AN SSSR. Otd. tekhn. n. Metallurgiya i toplivo, 5, 131-132, 1959) was unsatisfactory because of the impossibility of systematic study of these reaction films. This difficulty has now disappeared through application of microdiffraction technique with the aid of an electron microscope. The orientation of individual grains in the polycrystalline metal was ascertained by electron-optical representation of surface relief by means of an oxide replica, and the microdiffraction picture obtained from individual segments of the oxide film was then compared with the orientations of the oxides and the original metal. The authors discovered well-defined martensite structure in their

Card 1/2

L 12788-63

ACCESSION NR: AP3000790

investigation. The experimental data obtained indicate that the oxidation film formed by low-temperature oxidation of titanium in air and water vapor is on the order of 10 sup -6 cm thick and consists of rutile crystals, the orientation of which defines the orientation of original metal grains and is uniform within this grain. Orientations on neighboring grains are unrelated. Orig. art. has: 1 figure and refers to two others.

ASSOCIATION: Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut splavov i obrabotki tsvetnykh metallov (State Scientific Research and Planning Institute for Alloys and the Treatment of Nonferrous Metals)

SUBMITTED: 17May62

DATE ACQ: 21Jun63

ENCL: 00

SUB CODE: 00

NO REF SOV: 005

OTHER: 003

Card 2/2

LAYNER, D.I.; PETRUSEVICH, R.L.; SHIL'SHTEYN, S.Sh.

Theory of a two-crystal spectrometer. Kristalografiia 3 no.5:
711-714 S-O '63. (MIRA 16:10)

1. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut
splavov i obrabotki tsvetnykh metallov.

LAYNER, D.I.; BAY, A.S.; TSYPIN, M.I.

Kinetics of oxidation and the structure of scale on titanium.
Fiz. met. 1 metalloved. 16 no.2:225-231 Ag '63. (MIRA 16:8)

1. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut
obrabotki tsvetnykh metallov.
(Titanium---Metallography) (Oxidation)

LAYNER, D.I.; TSYPIN, M.I.; BAY, A.S.

Microdiffraction study of the low temperature oxidation of
polycrystalline materials. Zav. lab. 29 no.9:1093-1095 '63.
(MIRA 17:1)

1. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy
institut splavov i obrabotki tsvetnykh metallov.

LAYNER, D.I.; MALYSHEVA, L.A.; YEMEL'YANOV, L.G.; TROFIMOVA, I.V.;
LOBUSEVICH, N.P.; GOLUBETSOV, S.A.

Rate of cooling silicon-copper alloys. TSvet. met. 36 no.8:
76-79 Ag '63. (MIRA 16:9)
(Silicon-copper alloys---Metallography)
(Nonferrous ingots---Cooling)

L 36297-65 EWT(m)/EWA(d)/EPR/T/EWP(t)/EWP(b)/EWA(c) Pa- IP(a) JP
ACCESSION NR: AP4047425 S/0136/64/000/010/0063/0066

AUTHORS: Layner, D.I.; Kurakin, A.K. 24

TITLE: Reaction diffusion during the production of an Al-Cu bimetal B

SOURCE: Tsvetnyy metall*, no. 10, 1964, 63-66 21 21

TOPIC TAGS: reaction diffusion, cladding, aluminum copper

ABSTRACT: During the cladding of Al with Cu, a brittle chemical compound appears on the interface impeding further treatment of the semi-finished product. The authors investigated the nature of the phases which appear as a result of the diffusion of Al and Cu. Specimens were prepared from high-purity Cu and AV00 Al (0.0017 Fe, 0.0010 Si and 0.012% Cu). Chrome radiation proved sufficiently soft for the observation of the initial reaction at 150 C accompanied by the formation of a CuAl₂ intermediate layer. Subsequently, Cu radiation was applied. The formation of CuAl₂ and Cu₂Al₃ was noted at 350°C, followed by the formation of a third intermediate layer (CuAl) at 400°C. X-ray examination showed all Al to react to Cu -- a fact which is attributed to the thinness of the Al layer (10 microns).

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I-36297-65

ACCESSION No.: AP4047425

The direction of the diffusion was studied by using a 20 mu platinum marker. After a three-hour annealing period at 350 C, the marker was found inside an intermediary layer and the formation of a fourth $\text{Cu}_{12}\text{Al}_9$ layer was noted. The findings make it possible to choose the conditions of a cladding process. Orig. art. has: 3 figures.

ASSOCIATION: None

SUBMITTED: 00

ENCL: 00

SUB CODE: MM

NR REF SOV: 003

OTHER: 002

Card

2/2

10

ACCESSION NR: AP4044553

S/0204/64/004/004/0547/0551

AUTHOR: Freydlin, L. Kh., Borunova, N. V., Gvinter, L. I., Layner, D. I., Kagan, N.M.

TITLE: Investigation of the effect of cadmium on the activity and selectivity of nickel-zinc catalysts during hydrogenation of hydrocarbons

SOURCE: Neftekhimiya, v. 4, no. 4, 1964, 547-551

TOPIC TAGS: cadmium, nickel, zinc, nickel zinc catalyst, hydrogenation, catalyst selectivity, hydrocarbon, benzene, styrene, cyclohexene, octene, gas chromatography, catalytic hydrogenation

ABSTRACT: The effect of metallic cadmium on the activity and selectivity of nickel over zinc oxide catalysts during the hydrogenation of hydrocarbons, such as heptene-3 (b.p. 95.8-96.1C, $n_D^{20} = 1.4033$), a mixture of octenes (b.p. 123-125C, $n_D^{20} = 1.4140$), cyclohexene (b.p. 83C, $n_D^{20} = 1.4450$), styrene (b.p. 52-53 C/28mm Hg, $n_D^{20} = 1.5462$) and benzene (b. p. 80.1C, $n_D^{20} = 1.5017$), was investigated under flow conditions. After cooling to -5C,

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ACCESSION NR: AP4044553

the products were analyzed by gas chromatography. It was found that the relative amounts of cadmium necessary for deactivating the catalyst in the hydrogenation of benzene, cyclohexene and the ethyl bond of styrene were 0.2, 25 and 500% by weight. The probable mechanism of the action of cadmium at different temperatures was studied and discussed. It was established that a variation in the amount of Cd permits the selective hydrogenation of olefins in the presence of benzene or of styrene mixed with cyclohexene. The change in the catalytic properties of nickel due to the addition of Cd is due to the change in the composition and crystal structure of the surface layer of the catalyst. Under conditions close to those of the preparation of Ni-ZnO-Cd, cadmium interacts with nickel and forms an intermetallic compound. X-ray analysis and comparison of the interplanar spacings obtained previously showed that the reaction products of mixtures containing up to 70% Cd consist of nickel crystals and β -phase crystals (Cd_1, Ni_1). For products containing only 30% nickel, there was only one line of β -phase with a further increase in the Cd content in the mixture, lines of other intermetallic compounds, apparently with a higher cadmium content (β -phase), appear. On increasing the time of reaction of the catalysts, the loss in Cd increases. New active surface sites on the Ni catalyst are set free and the activity

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ACCESSION NR: AP4044553

increases. Using a catalyst poisoned with 5% Cd the degree of hydrogenation of pentene-3 was 25% after reduction for 10 hours and 90% after 40 hours. Orig. art. has: 4 figures and 2 tables.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo, AN SSSR (Institute of Organic Chemistry, AN SSSR); Gosudarstvenny*ynauchno-issledovatel'skiy institut splavov i obrabotki tsvetny*kh metallov (State Scientific Research Institute for Alloys and Non-Ferrous Metallurgy)

SUBMITTED: 02Jul63

SUB CODE: OC

NO REF SOV: 005

OTHER: 007

Card 3/3

L 58966-65 EPR/ENT(m)/ENP(k)/ENP(z)/ENA(c)/ENP(b)/T/ENA(d)/ENP(t) PF-l/PS-l
IJP(c) MJW/JD/EN

UR/0126/64/G18/001/0145/0145

ACCESSION NR: AP4042811

AUTHOR: Layner, D. I.; Kurakin, A. K.

TITLE: Mechanism of the effect of silicon present in aluminum on the processes of reaction diffusion of iron into aluminum

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 1, 1964, 145-148

TOPIC TAGS: solid state diffusion, iron compound, silicon compound, aluminum compound, iron diffusion, clad iron

ABSTRACT: The purpose of this study was to confirm or refute the formation of the ternary compound $Al_xSi_yFe_z$. In order to study the effect of silicon on the diffusion of iron into aluminum, an alloy was made from AV000 aluminum and silicon (1.2%). Bime-
tallic iron-aluminum specimens were prepared by rolling iron and coating it with layers of the Al-Si alloy 2 and 6 μ thick. After being vacuum-annealed, the specimens were studied by microscopic, x-ray structural, and electron diffraction analysis. The x-ray study showed the absence of a diffusion layer between iron and the aluminum alloy up to 550C. To determine the nature of the reaction diffusion in very thin layers at the interface between the two metals, the authors separated these layers by chemical means (etching), then

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ACCESSION NR: AP4042811

analyzed them by electron diffraction. It was found that the initial stage of the reaction diffusion involves the formation of the chemical compound FeAl_3 at 350C. As the temperature rose to just below 500C, no visible changes in the phase composition of the diffusion layer were observed. At 500C, a thin boundary layer of FeSiAl_5 was found to cover the entire surface of the specimen. The experiments show that the annealing of iron clad with aluminum containing 1.5% silicon causes the formation of the ternary chemical compound FeSiAl_5 . Orig. art. has: 1 figure and 3 tables.

ASSOCIATION: Giprotsvetmetobrabotka

SUBMITTED: 07Aug63

ENCL: 00

SUB CODE: MM, SS

NO REF SOV: 009

OTHER: 004

Card 2/2

L 17534-65 ENT(m)/EPF(c)/ENP(j)/T/ENP(t)/ENP(b) Pc-4/Pr-A LJP(c)/ASD(')-24
Pa-4 JD/RM

ACCESSION NR: AP4044197

S/0079/64/034/008/2706/2708

AUTHORS: Lobusevich, N.P.; Trofimova, I.V.; Golubtsov, S.A.; Andrianov, K.A.; Layner, D.I.; Maly'sheva, L.A.

TITLE: The effect of additions of certain elements to silicon copper alloys on their activity in the reaction with methyl chloride₂₇ 27

SOURCE: Zhurnal obshchey khimii, v. 34, no. 8, 1964, 2706-2708

TOPIC TAGS: silicon copper alloy, methyl chloride reaction, methylchlorosilane, synthesis, dimethyldichlorosilane, reaction promoter, reaction inhibitor, phosphorus, sulfur, beryllium, zinc, arsenic

ABSTRACT: The effect of phosphorus, sulfur, beryllium, zinc and arsenic on the overall and the selective activity of Si-Cu alloys in the direct synthesis of methylchlorosilanes was investigated. 0.005-0.008% of P or S and <0.1% of Be lowered the activity of the Si-Cu alloys as determined by the dimethyldichlorosilane yield. 0.05-0.1% As and 0.5-1.5% Zn acted as promoters, increasing the overall and the selective activity of the alloy and lowering the synthesis temperature from 360 to 320C. The nature of the effect of each additive changed depending on the presence of other impurities.

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L 17534-65

ACCESSION NR: AP4044197

Thus, P or Be, added to the alloy together with a promoter (Zn), significantly improved the catalyst properties of the Cu-Si alloys, reducing synthesis temperature by 20-40 degrees while increasing the yield of dimethyldichlorosilane to 75%. Orig. art. has: 7 figures and 1 table.

ASSOCIATION: None

SUBMITTED: 03May63

ENCL: 00

SUB CODE: MM, GC

NR REF SOV: 003

OTHER: 001

Card 2/2

LAYNER, D.I.; KURAKIN, A.K.

Reactive diffusion during the preparation of the aluminum-copper
bimetal. TSvet. met. 37 no.10:63-66 0 '64. (MIRA 18:7)

LAYNER, D.I.; KRUPNIKOVA-PERLINA, Ye.I.

Investigating the effect of the texture of copper on the
texture of cuprous oxide during high-temperature oxidation.
Trudy Giprotsetmetobrabotka no.24:66-74 '65.
(MIRA 18:11)

LAYNER, D.I.; BAY, A.S.

Certain characteristics of the mechanism of titanium and zirconium oxidation. Trudy Giprotsvetmetobrabotka no.24: 93-95 '65.

Growth patterns on the surface of titanium scale.
Ibid.:96-101 (MIRA 18:11)

LAYNER, D.I.; KURAKIN, A.K.

Reactive diffusion of iron in aluminum. Trudy Giprotsvetmetobrabotka no.24:124-130 '65.

Effect of the copper content in aluminum on processes of the reactive diffusion of nickel in aluminum. Ibid.:131-138 (MIRA 18:11)

LAYNER, D.I.; SOLOV'YEV, V.Ya.; KUZNETSOVA, M.I.; KRUPNIKOVA-PERLINA,
Ye.I.; SLESAREVA, Ye.N.

Studying the oxidation of niobium. Trudy Giprotsvetmetobrabotka
no.24:75-85 '65. (MIRA 18:11)

LAYNER, D.I.; TSYPIN, M.I.; SLESAREVA, Ye.N.; BAY, A.S.

Mechanism of the electric conductivity of rutile (TiO_2)
and the applicability of the Vagner-Khauffe theory to the
oxidation processes of titanium and its alloys. Trudy
Giprotsetmetobrabotka no.24:86-92 '65. (MIRA 18:11)

LAYNER, D.I.; CHERKASHINA, N.V.; BRIK, L.M.

Nature of the unweldability of copper. Trudy Giprotsevtsetc.
brabotka no.24:166-171 '65. (MIRA 18:11)

LAYNER, D.I.; OSTROVSKAYA, L.M.; SIMAKOVA, A.S.

Effect of halide impurities on the electric properties of
the Bi_2Te_3 - Bi_2Se_3 alloy. Trudy Giprotsetmetobrabotka no.24:
172-176 '65. (MIRA 18:11)

LAYNER, D.I.; MALYSHEVA, I.A.

Investigating the effect of small additions of elements of the 5th group of the periodic system on the catalytic activity of silicon-copper alloys. Trudy Giprotsvetmetobrabotka no.24:146-149 '65.

Effect of small additions of bismuth on the Cu_3Si decomposition process in the synthesis of methylchlorosilanes. Ibid.:150-156

Effect of small additions of arsenic on the phase constitution of Cu-Si alloys in the process of synthesizing methylchlorosilanes. Ibid.:157-165 (MIRA 18:11)

L 15180-66 EWP(e)/EWT(m)/EWA(d)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b) IJP(c) MJW/JD/JW/WB

ACC NR: AP6002666

SOURCE CODE: UR/0126/65/020/006/0864/0867

AUTHOR: Layner, P. I.; Bay, A. S.; Flesareva, Ye. N.; Tsypin, M. I.

ORG: Giprotsvetmetbrabotka

TITLE: Certain features of the process of the oxidation of titanium

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 6, 1965, 864-867

TOPIC TAGS: titanium, metal oxidation, metal scaling, activation energy, cation / VTl-1 titanium

ABSTRACT: Some quantitative features of the process of the oxidation of VTl-1 titanium at temperatures above 800°C in an air and water-vapor atmosphere at atmospheric pressure are presented. The published literature specifies the rate constants and activation energy for these regimes only for the case of the oxidation of Ti in O₂ and moreover it has been shown that during the oxidation in air of powdered-metal specimens containing 96% Ti the activation energy at temperatures above 800°C differs from the activation energy of oxidation in O₂. As for the process of the oxidation of Ti in water vapors at atmospheric pressure, even less is known about it. Accordingly, the authors performed a metallographic study of the oxidation of Ti in air with the object of determining the activation energies of the total absorption of oxygen, scaling, and absorption of oxygen by the metal base, as a function of the temperature

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UDC: 539.21

L 15180-66

ACC NR: AP6002666

$D, K_p, \text{cm}^2/\text{sec}$
 $K_l, \text{cm}/\text{sec}$

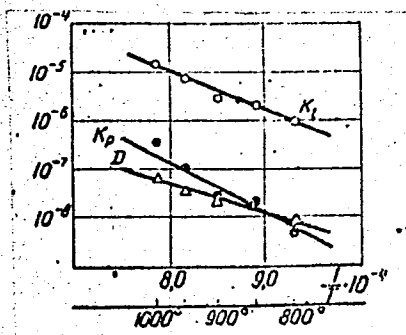


Fig. 1. Temperature dependence of parabolic rate constant K_p and linear rate constant K_l of scale growth, as well as of the coefficient D of the diffusion of Ti ions in scale, for oxidation of Ti in water vapors

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1 15180-66

ACT NR: AP6002666

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dependence of the parabolic rate constants of scale growth which showed that the activation energies Q_1 and Q_2 are virtually identical (about 67 kcal/mole-deg) whereas the activation energy Q_3 of the rate constant of oxygen absorption by the metal base is ~74 kcal/mole-deg. The concomitant study of the oxidation of Ti in water vapors showed that in this case the diffusion of ions of the metal through the scale plays a major role and may be described by the relation $K_p/D = 2$, where K_p is the parabolic scale-growth rate constant and D is the diffusion coefficient of metal ions. The activation energies calculated on this basis are 46, 40 and 30 kcal/mole-deg, respectively (Fig. 1) Comparison of K_p and D in the case of oxidation in water vapors at 800-1000°C shows that cation diffusion plays a principal role in the formation of scale under these conditions. Orig. art. has: 1 formula, 1 table, 5 figures.

SUB CODE: 07, 11, 20/ SUBM DATE: 16Jul65/ ORIG REF: 007/ OTH REF: 004

Card 3/3 vmb

24436-66 EWT(m)/EWA(d)/T/ENP(t) IJP(c) JD/HN/JH
ACC NR: AT6006480 SOURCE CODE: UR/2680/65/000/024/0131/0138

AUTHORS: Layner, D. I.; Kurakin, A. K.

ORG: State Scientific Research and Design Institute of Alloys and Nonferrous Metalworking, Moscow (Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut splavov i obrabotki tsvetnykh metallov)

TITLE: The influence of the copper content in aluminum on the diffusion of nickel into aluminum

SOURCE: Moscow. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut splavov i obrabotki tsvetnykh metallov. Trudy, no. 24, 1965. Metallovedeniye i obrabotka tsvetnykh metallov i splavov (Metal science and the treatment of non-ferrous metals and alloys), 131-138

TOPIC TAGS: nickel, aluminum, copper, nickel compound, aluminum plating/ AV000 aluminum

ABSTRACT: It was the object of this investigation to extend previously published work of D. I. Layner and A. K. Kurakin (FMM, vyp. 1, 1964, t. 18, str. 145-148) and, in particular, to determine whether complex ternary compounds of nickel-copper

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L 24436-65

ACC NR: AT6006480

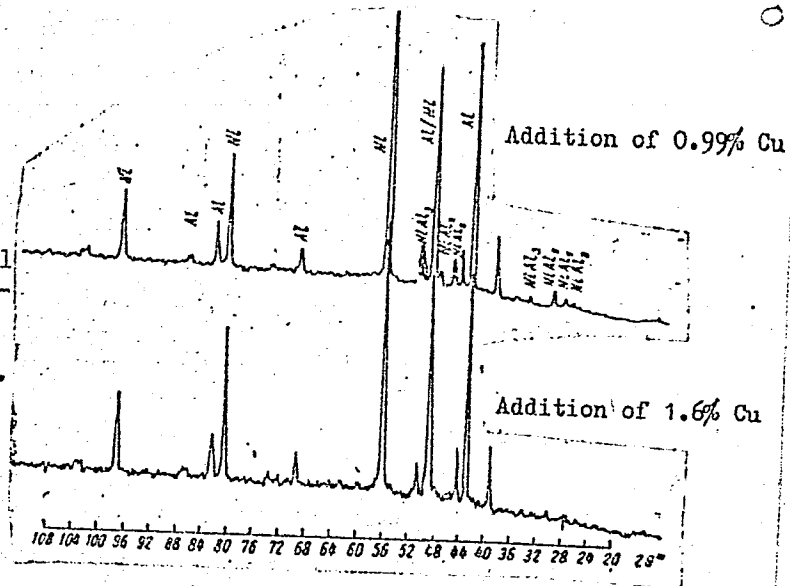
aluminum are formed at the aluminum-nickel interface of aluminum-clad nickel specimens, and also whether the formation of such compounds prevents the diffusion of nickel into aluminum. A number of specimens with aluminum coating containing from 0.99 to 4.08% copper was investigated. The diffusion was studied in the temperature range of 400 to 650C. The specimens were exposed to the various temperatures for a period of 30 minutes. After annealing, the nickel-aluminum interface of the specimens was subjected to microscopic and x-ray analysis. The experimental results are presented graphically (see Fig. 1). It was found that annealing of aluminum-clad specimens with aluminum coating containing ~ 2% Cu leads to the formation of a thin coating of the ternary compound Cu_3NiAl_6 at the nickel-aluminum interface of the specimens. It is suggested that the formation of such an interfacial coating should retard or prevent the diffusion of nickel into aluminum and thus prevent the deterioration of the aluminum coating of the specimens.

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L 24436-66

ACC NR: AT6006480

Fig. 1. X-ray diffraction spectra of bimetallic nickel-aluminum specimens containing 0.9% and 1.6% copper respectively. Annealing temperature 450C for 30 min.



Orig. art. has: 6 graphs.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 005

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L 24437-66 ENT(m)/ENR(N)/I/ENP(t) JD/JH
ACC NR: AT6006481

SOURCE CODE: UR/2680/65/000/024/0172/0176

AUTHORS: Layner, D. I.; Ostrovskaya, L. M.; Simakova, A. S.

ORG: State Scientific Research and Design Institute of Alloys and Nonferrous Metalworking, Moscow (Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut splavov i obrabotki tsvetnykh metallov)

TITLE: The effect of halide impurities on the electrical properties of Bi_2Te_3 - Bi_2Se_3 alloy

SOURCE: Moscow. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut splavov i obrabotki tsvetnykh metallov. Trudy, no. 24, 1965. Metallovedeniye i obrabotka tsvetnykh metallov i splavov (Metal science and the treatment of non-ferrous metals and alloys), 172-176

TOPIC TAGS: electric conductivity, thermal emf, ternary alloy, bismuth alloy, halide, electron donor, calcium compound, cadmium compound, lithium compound, manganese compound, thallium compound

ABSTRACT: The effect of chloride salts of calcium, cadmium, magnesium, lithium, and manganese and thallium bromide in concentrations of 0.05-0.8% (by mass) on the properties of a ternary alloy of 80% (mole) Bi_2Te_3 and 20% (mole) Bi_2Se_3 is studied. Melts of 50 g were prepared in sealed quartz ampules at 700C. All of

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ACC NR: AT6006481

the substances exerted a qualitatively similar effect (see Fig. 1);

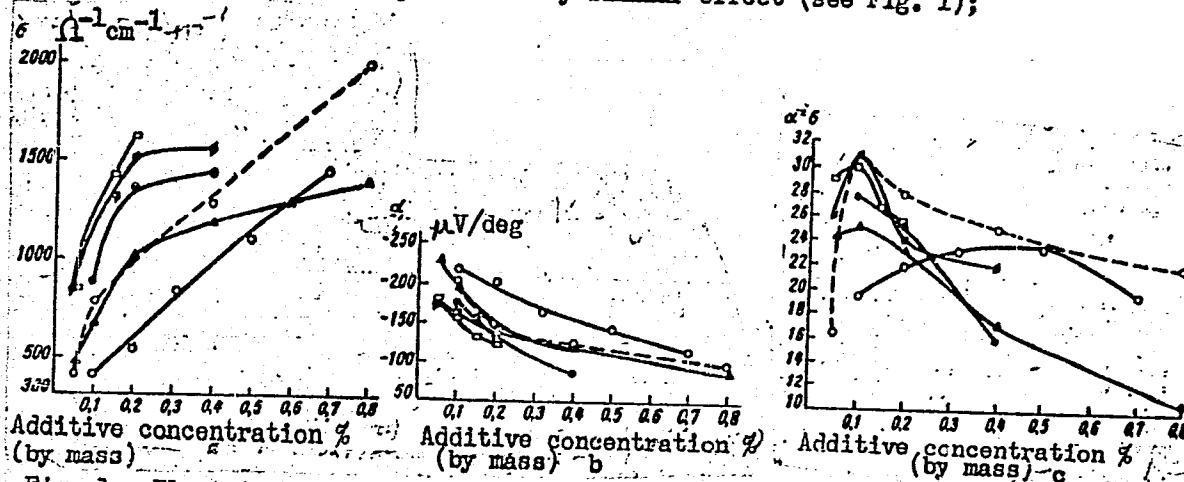


Fig. 1. Electrical conductivity (a) and thermo-emf (b) of alloy versus concentration of additive; $\alpha^2 \sigma$ versus concentration of additive (c): o-o-o TlBr; —o—o CaCl_2 ; -▲-▲ CdCl_2 ; -♢-♢ MnCl_2 ; -□-□ MgCl_2 ; -●-● LiCl.

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L 24437-66

ACC NR: AT6006481

they all dissolved in the alloy and formed very effective donor additives. Only the alloys with an addition of CaCl_2 were found to be stable; the properties of the others were greatly lowered during the first 20--30 days, regardless of storage conditions. Cadmium chloride is recommended as a protective alloy flux. Orig. art. has: 2 graphs and 1 table.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 002

Card 3/3 dda

L 04433-66 EWT(m)/EPF(n)-2/I/ENP(t) IJP(c) JD/WW/JG/WB

ACC NR: AT6006476

SOURCE CODE: UR/2680/65/000/024/0093/0095

AUTHORS: Layner, D. I.; Bay, A. S.

ORG: State Scientific Research and Design Institute of Alloys and Nonferrous Metalworking, Moscow (Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut splavov i obrabotki tsvetnykh metallov)

TITLE: Certain peculiarities of the oxidation mechanism of the oxidation of titanium and zirconium

SOURCE: Moscow. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut splavov i obrabotki tsvetnykh metallov. Trudy, no. 24, 1965. Metallovedeniye i obrabotka tsvetnykh metallov i splavov (Metal science and the treatment of nonferrous metals and alloys), 93-95

TOPIC TAGS: zirconium, zirconium oxide, electron microscopy, titanium, oxidation

ABSTRACT: The object of the investigation was to extend earlier published work on titanium by D. I. Layner, A. S. Bay, and M. I. Tsypin, (FMM, vyp. 2, 1963, t. 16), particularly the study of the microstructure of zirconium after it was exposed to air and water vapor at 1000C for periods of 30 and 120 minutes respectively and to compare the latter with the microstructure of titanium subjected to the same experimental conditions (see reference above). The microstructure was studied by means of electron microscopy. Several electron microscope pictures of the zirconium specimens are

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L 24433-66

ACC NR: AT6006476

presented. It was found that the oxide layer had an overall thickness of 130 μ . From the appearance of the electron microscope pictures, it is concluded that the surface oxidation of zirconium is controlled by oxygen atom migration and thus different from the surface oxidation of titanium where the dominating mechanism is the migration of titanium ions to the surface. Orig. art. has: 2 graphs.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 002/ OTH REF: 002

Card

2/2dda

1 24434-66 EWI(m)/T/ENP(t) IJP(c) JD/WB
ACC NR: AT6006477

SOURCE CODE: UR/2680/65/000/024/0096/0101

AUTHORS: Layner, D. I.; Bay, A. S.

ORG: State Scientific Research and Design Institute of Alloys and Nonferrous Metalworking, Moscow (Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut splavov i obrabotki tsvetnykh metallov)

TITLE: Growth forms on the surface of titanium sinter

SOURCE: Moscow. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut splavov i obrabotki tsvetnykh metallov. Trudy, no. 24, 1965. Metallovedeniye i obrabotka tsvetnykh metallov i splavov (Metal science and the treatment of nonferrous metals and alloys), 96-101

TOPIC TAGS: titanium, titanium oxide, electron microscopy, ^{metal}oxidation

ABSTRACT: The object of this investigation was to extend earlier published work of D. I. Layner, A. S. Bay, and M. I. Tsypin (FMM, vyp. 2, 1963, t. 16, str. 225-231) and, in particular, to investigate the surface structure of titanium after it was oxidized by water vapor at 900C, in air at 850 and 1000C, and in oxygen at 1200C. The investigation was conducted by optical and electron microscopy. Electronmicroscop pictures of the various specimens are presented. It was found that the microstructure of the surface changes with the change in the nature of the oxidizing medium. It is suggested that the observed crystalline shapes arise from a migration of titanium ions.

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